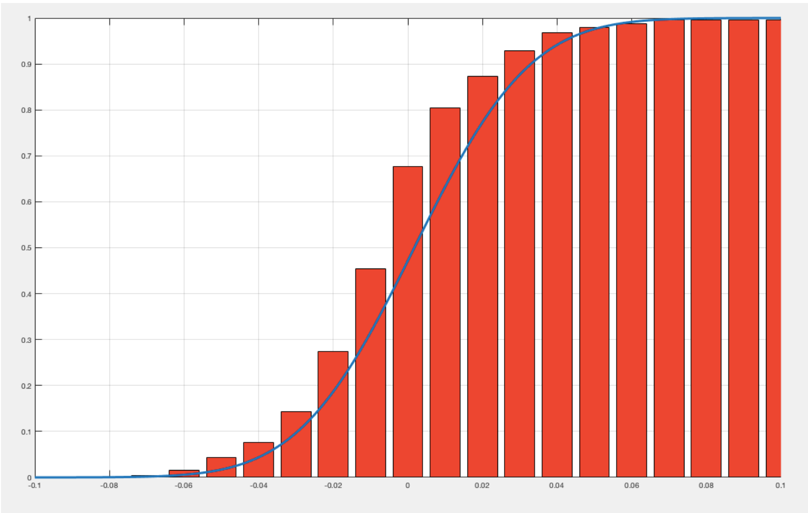
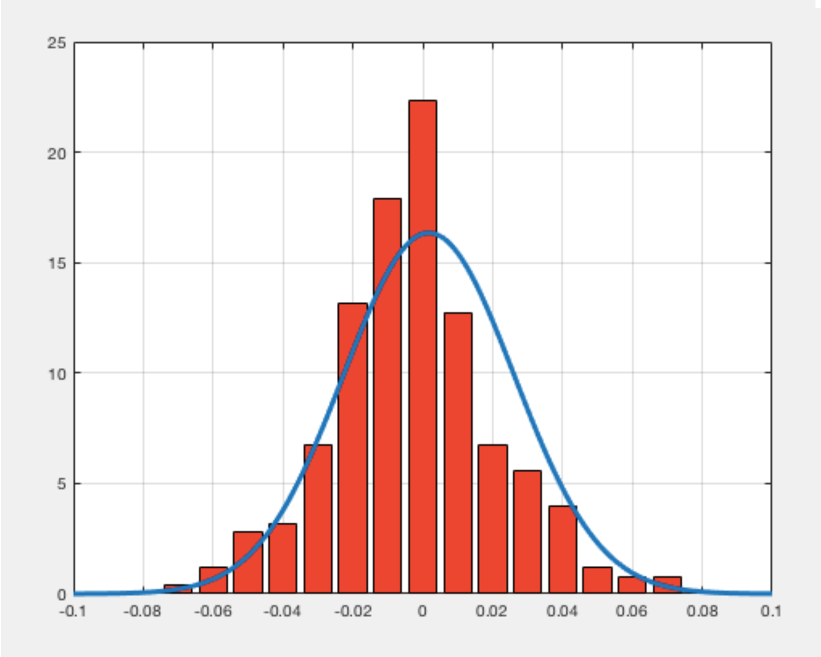
B)
mu_hat =0.6275
sigma_sqr_hat =0.2174

C)





H)

mu_hat = 0.6275

sigma_sqr_hat = 0.2174

c = 0.7190 0.2941 0.1243

From the generated output,
c= 0.7190 for K=0.8 E(X(t))
c= 0.2941 for K= E(X(t))
c= 0.1243 for K= 1.2E(X(t))

It is clear that at K=0.8 E(X(t)) the user pays the highest price, so this transaction option is most likely to be exercised, however it comes with higher risk. While the at K=1.2E(X(t)) the price user pay is lowest. This strategy result in a lower transaction, but comes with much lower risk.

Code:

```
function hw10
clear; close all;

% First day in the data series corresponds to 11/25/2008
% First column of data contains volume traded, following four columns
% contain high, low, open and close prices for the stock. The 6th column
% containes the days between the prices in different rows (1 for regular
% days of the week, 3 for weekends, 4 for long weekends and 2 for
% holidays). The 7th column contains the number of days elapsed since
% 11/24/2008.

% Use close price for your analysis

%    Volume(M) High      Low       Open      Close    days between prices    days elapsed
aux=[ .
      .
      .
      /data skipped
     36.32     23.57     23.30     23.50     23.46                 1        361
     29.30     23.91     23.65     23.69     23.90                 3        364
     29.98     23.90     23.56     23.83     23.74                 1        365];

volume_traded = aux(:,1);
high_price    = aux(:,2);
low_price     = aux(:,3);
open_price    = aux(:,4);
close_price   = aux(:,5);
days_between_prices = aux(:,6);
days_elapsed        = aux(:,7);

B(close_price)
C(close_price)
H(close_price)

end

function B(close_price)
Z=log(close_price);
Y=Z(2:end)-Z(1:end-1);
N=length(Y);
h=1/365;
mu_hat=sum(Y)/(N*h) % Sample mean
sigma_sqr_hat=sum((Y-mu_hat*h).^2)/((N-1)*h) % Sample variance
```

```
end

function C(close_price)
Z=log(close_price);
 Y=Z(2:end)-Z(1:end-1);
 N=length(Y);
 h=1/365;
 x=-0.1:0.01:0.1;
 n_elements = histc(Y,x);
 figure(1)
 bar(x,n_elements/N/0.01,'r')
 hold on
 mu_hat=0.6275;
 sigma_sqr_hat=0.2174;
 x_padded=-0.1:0.001:0.1;
 plot(x_padded,normpdf(x_padded, mu_hat*h, sqrt(sigma_sqr_hat*h)),'Linewidth',3)
 grid on
 axis([-0.1 0.1 0 25])

 figure(2)
 c_elements= cumsum(n_elements)/N;
 bar(x, c_elements, 'r')
 hold on
 x_padded=-0.1: 0.001:0.1;
 plot(x_padded, normcdf(x_padded, mu_hat*h, sqrt(sigma_sqr_hat*h)),'Linewidth',3)
 grid on
 axis([-0.1 0.1 0 1])
end


function H(close_price)
 Z=log(close_price);
 Y=Z(2:end)-Z(1:end-1);
 N=length(Y);
 h=1/365;
 mu_hat=sum(Y)/(N*h) % Sample mean
 sigma_sqr_hat=sum((Y-mu_hat*h).^2)/((N-1)*h) % Sample variance
 alpha=0.0375;
 X_0=close_price(1,1);
 EX=X_0*exp(mu_hat+sigma_sqr_hat/2);
 K=[0.8 1 1.2]*EX;
 a=(log(K/X_0)-(alpha-sigma_sqr_hat/2))/(sqrt(sigma_sqr_hat));
 b=a-sqrt(sigma_sqr_hat);
 Q_a=1-normcdf(a,0,1);
 Q_b=1-normcdf(b,0,1);
 c=X_0*Q_b-exp(-alpha)*K.*Q_a
end
```